

AMENDMENTS TO THE CLAIMS

Claims 1-2, 7-11, 13, 15-16, 21-74, 78-85, 90, 105-112 and 116-124 are cancelled. Below are the now-pending claims 3-6, 12, 14, 17-20, 75-77, 86-89, 91-104 and 113-115.

1-2. (Canceled)

3. (Currently Amended) ~~The portable card of claim 1~~ A portable card adapted to be used in a card processing system having a data processing station comprising:

a data storage device adapted to interact with a data processing station when the portable card and the data processing station are moved relative to each other, said data storage device including

a substrate having a predetermined shape;

at least one layer of high density, high coercivity magnetic material for storing magnetic signals; and

a relatively hard, abradable protective coating formed on said magnetic material layer and being selected to have a thickness between a maximum thickness which would materially attenuate magnetic signals passing between said magnetic material layer and a transducer and a minimum thickness enabling said protective coating to be abraded by usage in an ambient natural atmosphere operating environment for removing therefrom a known quantity of the protective coating,

wherein protective coating has at least one layer which includes a magnetically permeable, magnetically saturable material.

4. (Currently Amended) ~~The portable card of claim 1~~ A portable card adapted to be used in a card processing system having a data processing station comprising:

a data storage device adapted to interact with a data processing station when the portable card and the data processing station are moved relative to each other, said data storage device including

a substrate having a predetermined shape;

at least one layer of high density, high coercivity magnetic material for storing magnetic signals; and

a relatively hard, abradable protective coating formed on said magnetic material layer and being selected to have a thickness between a maximum thickness which would materially attenuate magnetic signals passing between said magnetic material layer and a transducer and a minimum thickness enabling said protective coating to be abraded by usage in an ambient natural atmosphere operating environment for removing therefrom a known quantity of the protective coating,

wherein protective coating has at least two layers, wherein a first one of said at least two layers includes a magnetically permeable, magnetically saturable material and the the second one of said at least two layers is a non-magnetic friction reducing layer formed on said first one of said layers.

5. (Currently Amended) ~~The portable card of claim 1~~ A portable card adapted to be used in a card processing system having a data processing station comprising:

a data storage device adapted to interact with a data processing station when the portable card and the data processing station are moved relative to each other, said data storage device including

a substrate having a predetermined shape;

at least one layer of high density, high coercivity magnetic material for storing magnetic signals; and

a relatively hard, abradable protective coating formed on said magnetic material layer and being selected to have a thickness between a maximum thickness which would materially attenuate magnetic signals passing between said magnetic material layer and a transducer and a minimum thickness enabling said protective coating to be abraded by usage in an ambient natural atmosphere operating environment for removing therefrom a known quantity of the protective coating,

wherein said at least one magnetic material layer is formed of a high density, high coercivity magnetic material having a predetermined magnetic field orientation and wherein said protective coating has at least one layer which includes a magnetically permeable, magnetically saturable material and wherein said data storage device further includes

a non-magnetic material layer positioned between the protective coating and said at least one magnetic material layer, said magnetically permeable, magnetically saturable material being responsive through said non-magnetic layer to predetermined magnetic field orientation to produce a magnetic image field in a direction opposite to said predetermined magnetic field orientation.

6. (Currently Amended) ~~The portable card of claim 1~~ A portable card adapted to be used in a card processing system having a data processing station comprising:

a data storage device adapted to interact with a data processing station when the portable card and the data processing station are moved relative to each other, said data storage device including

a substrate having a predetermined shape;
at least one layer of high density, high coercivity magnetic material for storing magnetic signals; and

a relatively hard, abradeable protective coating formed on said magnetic material layer and being selected to have a thickness between a maximum thickness which would materially attenuate magnetic signals passing between said magnetic material layer and a transducer and a minimum thickness enabling said protective coating to be abraded by usage in an ambient natural atmosphere operating environment for removing therefrom a known quantity of the protective coating,

wherein said at least one magnetic material layer is formed of a high density, high coercivity magnetic material having a predetermined magnetic field orientation and wherein said protective coating has at least two layers, wherein a first one of said at least two layers includes a magnetically permeable, magnetically saturable material and the ~~the~~ second one of said at least two layers is a non-magnetic friction reducing layer formed on said first one of said at least two layers and wherein said data storage device further includes a non-magnetic material layer positioned between the protective coating and said at least one magnetic material layer, said magnetically permeable, magnetically saturable material being responsive through said non-magnetic layer to predetermined magnetic field orientation to produce a magnetic image field in a direction opposite to said predetermined magnetic field orientation.

7-11. (Canceled)

12. (Currently Amended) ~~The portable card of claim 1~~ A portable card adapted to be used in a card processing system having a data processing station comprising:

a data storage device adapted to interact with a data processing station when the portable card and the data

processing station are moved relative to each other, said data storage device including

a substrate having a predetermined shape;

at least one layer of high density, high coercivity magnetic material for storing magnetic signals; and

a relatively hard, abradable protective coating formed on said magnetic material layer and being selected to have a thickness between a maximum thickness which would materially attenuate magnetic signals passing between said magnetic material layer and a transducer and a minimum thickness enabling said protective coating to be abraded by usage in an ambient natural atmosphere operating environment for removing therefrom a known quantity of the protective coating,

wherein said protective coating has an outer surface and further comprises a bonded lubricant layer formed on said outer surface and having a thickness which is less than the thickness of said protective coating.

13. (Canceled)

14. (Currently Amended) ~~The portable card of claim 1~~ A portable card adapted to be used in a card processing system having a data processing station comprising:

a data storage device adapted to interact with a data processing station when the portable card and the data processing station are moved relative to each other, said data storage device including

a substrate having a predetermined shape;

at least one layer of high density, high coercivity magnetic material for storing magnetic signals; and

a relatively hard, abradable protective coating formed on said magnetic material layer and being selected to have a

thickness between a maximum thickness which would materially attenuate magnetic signals passing between said magnetic material layer and a transducer and a minimum thickness enabling said protective coating to be abraded by usage in an ambient natural atmosphere operating environment for removing therefrom a known quantity of the protective coating,

wherein said protective coating thickness includes two substantially parallel layers one of which is formed of a magnetically permeable, magnetically saturable material having a thickness in the range of about 50 Angstroms to about 750 Angstroms and the other of which is a diamond-like carbon layer having a thickness in the range of about 150 Angstroms to about 300 Angstroms.

15-16. (Canceled)

17. (Currently Amended) ~~The portable card of claim 1~~ A portable card adapted to be used in a card processing system having a data processing station comprising:

a data storage device adapted to interact with a data processing station when the portable card and the data processing station are moved relative to each other, said data storage device including

a substrate having a predetermined shape;
at least one layer of high density, high coercivity magnetic material for storing magnetic signals; and

a relatively hard, abradable protective coating formed on said magnetic material layer and being selected to have a thickness between a maximum thickness which would materially attenuate magnetic signals passing between said magnetic material layer and a transducer and a minimum thickness enabling said protective coating to be abraded by usage in an ambient

natural atmosphere operating environment for removing therefrom a known quantity of the protective coating,

wherein said magnetically permeable, magnetically saturable material has a thickness in the range of about 50 Angstroms to about 750 Angstroms and wherein said non-magnetic material layer has a thickness in the range of about 20 Angstroms to about 150 Angstroms.

18. (Previously Presented) The portable card of claim 5 wherein said protective coating thickness includes two substantially parallel layers a first one of which the magnetically permeable, magnetically saturable material, which has a thickness in the range of about 50 Angstroms to about 750 Angstroms, and the second of which is a diamond-like carbon layer on the layer of the magnetically permeable, magnetically saturable material and having a thickness in the range of about 150 Angstroms to about 300 Angstroms, and wherein said nonmagnetic material layer has a thickness in the range of about 20 Angstroms to about 150 Angstroms.

19. (Currently Amended) ~~The portable card of claim 1~~ A portable card adapted to be used in a card processing system having a data processing station comprising:

a data storage device adapted to interact with a data processing station when the portable card and the data processing station are moved relative to each other, said data storage device including

a substrate having a predetermined shape;
at least one layer of high density, high coercivity magnetic material for storing magnetic signals; and

a relatively hard, abradable protective coating formed on said magnetic material layer and being selected to have a

thickness between a maximum thickness which would materially attenuate magnetic signals passing between said magnetic material layer and a transducer and a minimum thickness enabling said protective coating to be abraded by usage in an ambient natural atmosphere operating environment for removing therefrom a known quantity of the protective coating,

wherein said protective coating thickness includes two substantially parallel layers one of which is formed of a magnetically permeable, magnetically saturable material having a thickness about 400 Angstroms and the other of which is a diamond-like carbon layer having a thickness about 150 Angstroms.

20. (Currently Amended) ~~The portable card of claim 1~~ A portable card adapted to be used in a card processing system having a data processing station comprising:

a data storage device adapted to interact with a data processing station when the portable card and the data processing station are moved relative to each other, said data storage device including

a substrate having a predetermined shape;

at least one layer of high density, high coercivity magnetic material for storing magnetic signals; and

a relatively hard, abradable protective coating formed on said magnetic material layer and being selected to have a thickness between a maximum thickness which would materially attenuate magnetic signals passing between said magnetic material layer and a transducer and a minimum thickness enabling said protective coating to be abraded by usage in an ambient natural atmosphere operating environment for removing therefrom a known quantity of the protective coating,

wherein said protective coating thickness includes two substantially parallel layers one of which is formed of a magnetically permeable, magnetically saturable material having a thickness about 400 Angstroms and the other of which is a diamond-like carbon layer having a thickness about 150 Angstroms and wherein said non-magnetic material layer has a thickness in the range of about 20 Angstroms to about 150 Angstroms.

21-74. (Canceled)

75. (Currently Amended) ~~The data storage device of claim 74~~
A data storage device comprising

at least one layer of high density, high coercivity
magnetic material for storing data; and

a relatively hard, abradable protective coating formed on
said magnetic material layer and being selected to have a
thickness between a maximum thickness which would materially
attenuate magnetic signals passing between said magnetic
material layer and a transducer and a minimum thickness enabling
said protective coating to be abraded by usage in an ambient
natural atmosphere operating environment for removing therefrom
a known quantity of said protective coating material,

wherein said protective coating is of a diamond-like hardness forming a bendable, abradable protective coating.

76. (Currently Amended) ~~The data storage device of claim 74~~
A data storage device comprising

at least one layer of high density, high coercivity
magnetic material for storing data; and

a relatively hard, abradable protective coating formed on
said magnetic material layer and being selected to have a
thickness between a maximum thickness which would materially

attenuate magnetic signals passing between said magnetic material layer and a transducer and a minimum thickness enabling said protective coating to be abraded by usage in an ambient natural atmosphere operating environment for removing therefrom a known quantity of said protective coating material,

wherein said protective coating is formed of a magnetically permeable, magnetically saturable material and the known quantity of magnetically permeable, magnetically saturable material removed by usage is to that minimum thickness thereof which is capable of supporting magnetic flux density of a reading signal.

77. (Currently Amended) ~~The data storage device of claim 74~~
A data storage device comprising

at least one layer of high density, high coercivity magnetic material for storing data; and

a relatively hard, abradeable protective coating formed on said magnetic material layer and being selected to have a thickness between a maximum thickness which would materially attenuate magnetic signals passing between said magnetic material layer and a transducer and a minimum thickness enabling said protective coating to be abraded by usage in an ambient natural atmosphere operating environment for removing therefrom a known quantity of said protective coating material,

wherein said protective coating is formed of a magnetically permeable, magnetically saturable material and the known quantity of magnetically permeable, magnetically saturable material removed by usage is to a thickness at which the magnetically permeable, magnetically saturable material commences to emit a detectable quantity of magnetic flux leakage.

78-85. (Canceled)

86. (Currently Amended) ~~The data storage device of claim 74~~
A data storage device comprising
at least one layer of high density, high coercivity
magnetic material for storing data; and
a relatively hard, abradable protective coating formed on
said magnetic material layer and being selected to have a
thickness between a maximum thickness which would materially
attenuate magnetic signals passing between said magnetic
material layer and a transducer and a minimum thickness enabling
said protective coating to be abraded by usage in an ambient
natural atmosphere operating environment for removing therefrom
a known quantity of said protective coating material,
wherein said protective coating has at least one layer
which includes a magnetically permeable, magnetically saturable
material.

87. (Currently Amended) ~~The data storage device of claim 74~~
A data storage device comprising
at least one layer of high density, high coercivity
magnetic material for storing data; and
a relatively hard, abradable protective coating formed on
said magnetic material layer and being selected to have a
thickness between a maximum thickness which would materially
attenuate magnetic signals passing between said magnetic
material layer and a transducer and a minimum thickness enabling
said protective coating to be abraded by usage in an ambient
natural atmosphere operating environment for removing therefrom
a known quantity of said protective coating material,
wherein said protective coating has at least two layers
wherein a first one of said at least two layers includes a

magnetically permeable, magnetically saturable material and the the second of said at least two layers is a non-magnetic friction reducing layer formed on said first one of said layers.

88. (Currently Amended) ~~The data storage device of claim 74~~
A data storage device comprising

at least one layer of high density, high coercivity
magnetic material for storing data; and

a relatively hard, abradable protective coating formed on
said magnetic material layer and being selected to have a
thickness between a maximum thickness which would materially
attenuate magnetic signals passing between said magnetic
material layer and a transducer and a minimum thickness enabling
said protective coating to be abraded by usage in an ambient
natural atmosphere operating environment for removing therefrom
a known quantity of said protective coating material,

wherein said data storage device further comprises:

a bonded, cleanable lubrication layer formed on said protective coating.

89. (previously presented) A data storage device comprising:

a substrate having at least one surface;

at least one high density magnetically coercive material layer disposed on said substrate for storing magnetic signals with the coercive material axis of magnetization oriented in a predetermined direction relative to said at least one surface of said substrate;

a bendable, diamond like hardness protective coating having a thickness which allows passage of magnetic signals in an ambient natural atmospheric operating environment through said protective layer and between said at least one high density

magnetically coercive material layer and a transducer, said protective layer being formed of a material which resists at least one of chemical, magnetic and mechanical degradation of the data storage device; and

at least one non-magnetic material layer disposed on said substrate and between said protective coating and said at least one high density magnetically coercive material layer for defining an exchange break layer.

90. (Canceled)

91. (Previously Presented) The data storage device of claim 89 wherein said substrate is a non-magnetic substrate and said protective coating includes

a magnetically permeable, magnetically saturable material disposed on said substrate and being responsive through said exchange break layer to the coercive material axis of magnetization in said predetermined direction to produce a magnetic image field in a direction opposite to said predetermined direction.

92. (Previously Presented) The data storage device of claim 89 wherein said protective coating includes said magnetically permeable, magnetically saturable material as a separate independent layer disposed on said exchange break layer.

93. (Previously Presented) The data storage device of claim 89 wherein said protective coating includes a non-magnetic friction resisting layer as a separate independent layer disposed on said magnetically permeable, magnetically saturable material layer.

94. (Original) The data storage device of claim 89 wherein said predetermined direction is orientated substantially parallel to said at least one surface of said substrate.

95. (Original) The data storage device of claim 89 wherein said predetermined direction is orientated at an acute angle to said at least one surface of said substrate.

96. (Original) The data storage device of claim 89 wherein said predetermined direction is orientated substantially perpendicular to said. at least one surface of said substrate.

97. (Original) A magnetically encoded card comprising
a non-magnetic substrate having at least one surface,
a thin film, high density magnetically coercive material
disposed on said substrate for storing magnetic signals with the
coercive material axis of magnetization oriented in a
predetermined direction relative to said at least on surface of
said substrate;

a non magnetic material disposed on said substrate for
defining an exchange break layer; and

a relatively hard, bendable, abradeable protective coating
formed on said magnetic material layer and being selected to
have a thickness between a maximum thickness which would
materially attenuate magnetic signals passing between said
magnetic material layer and a transducer and a minimum thickness
enabling said protective coating to be abraded by usage in an
ambient natural atmosphere operating environment for removing
therefrom a known quantity of the protective coating.

98. (Original) The magnetically encoded card of claim 97
wherein said protective coating is formed on said substrate in a

direction substantially normal to said exchange break layer, said protective coating including a magnetically permeable, magnetically saturable material disposed on said substrate and being responsive through said exchange break layer and said magnetically saturable material to the coercive material axis of magnetization to produce a magnetic image field in a direction to facilitate passage of magnetic signals in an ambient natural atmospheric operating environment through said exchange break layer and said magnetically saturable material, said coercive material having said axis of magnetization in said predetermined direction.

99. (Original) The magnetically encoded card of claim 97 wherein said protective coating includes said magnetically permeable, magnetically saturable material as an independent layer disposed on said substrate.

100. (Original) The magnetically encoded card of claim 97 wherein said protective coating includes a non-magnetic friction resisting material as a separate layer disposed on said magnetically permeable, magnetically saturable material.

101. (Original) The magnetically encoded card of claim 97 wherein said predetermined direction is orientated substantially parallel to said at least one surface of said substrate.

102. (Original) The magnetically encoded card of claim 97 wherein said predetermined direction is orientated at an acute angle to said at least one surface of said substrate.

103. (Original) The data storage device of claim 97 wherein said predetermined direction is orientated substantially perpendicular to said at least one surface of said substrate.

104. (Original) The magnetically encoded card of claim 97 wherein the magnetically coercive material is at least 1,000 Oersteds and wherein said magnetically permeable, magnetically saturable material is less than about 100 Oersteds.

105-112. (Canceled)

113. (Currently Amended) ~~The data storage device of claim 111~~ A data storage device comprising

at least one thin film layer of high density, high coercivity magnetic material having a predetermined magnetic field orientation for storing data; and

a relatively hard, abradeable protective coating formed on said magnetic material layer and being selected to have a thickness between a maximum thickness which would materially attenuate magnetic signals passing between said at least one thin film layer and a transducer and a minimum thickness enabling said protective coating to be abraded by usage in an ambient natural atmosphere operating environment for removing therefrom a known quantity of the protective coating, said data storage device being adapted to interface with and be responsive to a transducer when said data storage device and said transducer are moved relative to each other to enable data flow therebetween,

wherein said protective coating has at least one layer which includes a magnetically permeable, magnetically saturable material.

114. (Currently Amended) ~~The data storage device of claim~~
~~112~~ A data storage device comprising

at least one thin film layer of high density, high
coercivity magnetic material having a predetermined magnetic
field orientation for storing data; and

a relatively hard, abradable protective coating formed on
said magnetic material layer and being selected to have a
thickness between a maximum thickness which would materially
attenuate magnetic signals passing between said at least one
thin film layer and a transducer and a minimum thickness
enabling said protective coating to be abraded by usage in an
ambient natural atmosphere operating environment for removing
therefrom a known quantity of the protective coating, said data
storage device being adapted to interface with and be responsive
to a transducer when said data storage device and said
transducer are moved relative to each other to enable data flow
therebetween,

wherein said protective coating has at least two layers
wherein a first one of said at least two layers includes a
magnetically permeable, magnetically saturable material and the
second of said at least two layers is a non-magnetic abrasion
resisting layer formed on said first one of said at least two
layers.

115. (Currently Amended) ~~The data storage device of claim~~
~~112~~ A data storage device comprising

at least one thin film layer of high density, high
coercivity magnetic material having a predetermined magnetic
field orientation for storing data; and

a relatively hard, abradable protective coating formed on
said magnetic material layer and being selected to have a
thickness between a maximum thickness which would materially

attenuate magnetic signals passing between said at least one thin film layer and a transducer and a minimum thickness enabling said protective coating to be abraded by usage in an ambient natural atmosphere operating environment for removing therefrom a known quantity of the protective coating, said data storage device being adapted to interface with and be responsive to a transducer when said data storage device and said transducer are moved relative to each other to enable data flow therebetween,

wherein said data storage device further comprises

a bonded, cleanable lubrication layer applied to an outer surface of said protective coating, said bonded, cleanable lubrication layer having a thickness which is less than the thickness of said protective coating.

116-124. (Canceled)